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मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

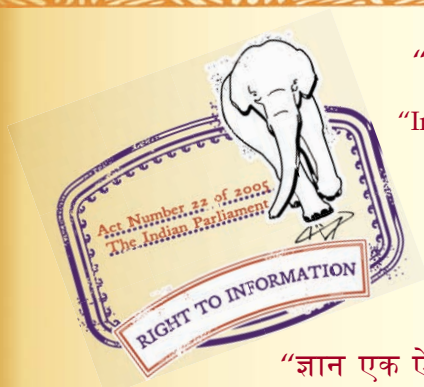
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 1448-24 (1971): Methods of Test for Petroleum and its Products, Part 24: Kauri-Butanol Value [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 1448 [P : 24] - 1971

Adopted : 20 December 1971

Indian Standard (Reaffirmed 2002)

METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS [P : 24] KAURI-BUTANOL VALUE (*First Revision*)

First Reprint FEBRUARY 1982

UDC 667-629-2-062-2 : 543-436 [547-264 KAU]

Adapted from the ASTM Standard No. D 1133-61

1. SCOPE

1.1 This method is intended for determining the relative solvent power of hydrocarbon solvents used in paint and lacquer formulations. The method is suitable for use with solvents having an initial boiling point over 40°C and a dry point under 300°C, when determined by IS : 1448 [P : 18]-1967*.

2. TERMINOLOGY

2.0 For the purpose of this method, the following definition shall apply.

2.1 Kauri-Butanol Value — The volume in millilitres at 25°C of the solvent, corrected to a defined standard, required to produce a defined degree of turbidity when added to 20 g of a standard solution of kauri resin in normal butyl alcohol. For kauri-butanol values of 60 and over, the standard is toluene and has an assigned value of 105. For kauri-butanol values under 60, the standard is a blend of 75 percent *n*-heptane and 25 percent toluene, and has an assigned value of 40.

3. OUTLINE OF THE METHOD

3.1 In this method, 20 g of a standard solution of kauri resin in normal butyl alcohol is titrated with the solvent to be tested till the sharp outlines of 10-point print placed directly beneath the water-bath or directly below the flask when observed through the resulting solution of kauri resin get obscured or blurred, but not illegible.

*Methods of test for petroleum and its products : Distillation.

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4. APPARATUS

4.1 Water-Bath — a clear glass vessel, maintained at $25 \pm 1^\circ\text{C}$; alternatively, a room maintained at $25 \pm 1^\circ\text{C}$ may be used.

4.2 Volumetric Flask — of 200-ml capacity.

4.3 Erlenmeyer Flask — of 250-ml capacity.

4.4 Burette — of 50-ml capacity.

4.5 Print Specimen — a sheet of white paper having on it black 10 on 12-point print, Monotype Baskerville; a specimen in 10 on 12-point print is given below:

The volume in millilitres at 25°C of the solvent, corrected to a defined standard, required to produce a defined degree of turbidity when added to 20 g of a standard solution of kauri resin in normal butyl alcohol. For kauri-butanol values of 60 and over, the standard is toluene and has an assigned value of 105. For kauri-butanol values under 60, the standard is a blend of 75 percent *n*-heptane and 25 percent toluene and has an assigned value of 40.

5. REAGENTS

5.1 Kauri-Butanol Solution* — Place in a 3-litre flask 400 g of clean, pale, bold kauri resin of grade XXXX, XXX or XX ground to about pea-size or smaller. Add, while agitating vigorously, 2 000 g of *n*-butyl alcohol of boiling range 116 to 118°C (see IS: 361-1962†). Shake in a mechanical shaker until the resin goes into solution, warming to about 55°C , if necessary, to aid in solution. If a mechanical shaker is not available, fit the flask with a reflux condenser and heat in a steam-bath until the kauri resin is all dissolved. Permit the solution to stand for 48 hours and then clarify by filtration through a Buchner funnel with suction, using double filter paper and changing as frequently as necessary.

5.2 Toluene — for use as a high-solvency standard, nitration grade (see IS: 537-1967‡).

5.3 Heptane-Toluene Blend — consisting of 25.0 ± 0.1 percent toluene and 75.0 ± 0.1 percent *n*-heptane, for use as a low solvency standard. The

*Prepared kauri-butanol solutions are available from the American Gum Importers Laboratories Inc, 2 Park Avenue, New York, N.Y. and the Chemical Service Laboratories, 2902 North Henderson, Dallas 6, Texas.

†Specification for normal butyl alcohol, technical (revised).

‡Specification for toluene, pure, nitration grade (first revision).

heptane (knock test grade) shall conform to the following requirements:

<i>Characteristic</i>	<i>Requirement</i>
Density at 20°C, g/ml	0.683 6 to 0.684 0
Distillation:	
Temperature of 50 per- cent recovery	98.40 to 98.45°C
Temperature increase from 20 to 80 percent recovery, <i>Max</i>	0.20°C
Freezing point, <i>Min</i>	-90.72°C
Octane number	0.0 ± 0.2
Refractive index, n_D^{20C} at 20°C	1.387 6 to 1.387 8

5.3.1 The blend of 25.0 ± 0.1 percent toluene and 75.0 ± 0.1 percent heptane may be prepared in any way that will give the desired accuracy. The following technique is adequate:

Bring the pure toluene and pure heptane and a calibrated 200-ml volumetric flask to the same temperature preferably in a constant temperature room or a thermostat. Run 50 ml of toluene into the 200-ml volumetric flask, using a burette or pipette calibrated to deliver 50 ml of toluene at the chosen temperature (preferably 25°C). Fill the volumetric flask to slightly below the calibration line with *n*-heptane, insert the ground-glass stopper of the volumetric flask, and mix carefully by repeatedly inverting the flask. Allow to stand for a few minutes and then bring to the 200-ml calibration mark with heptane and again carefully mix.

6. STANDARDIZATION

6.1 Weigh 20.0 ± 0.1 g of kauri-butanol solution into a 250-ml Erlenmeyer flask and place in the water-bath at 25°C. Titrate with toluene in the flask, with constant swirling, while maintaining the mixture in the flask at 25°C. Gradually reduce the successive amounts of toluene added as the end-point is approached. The end-point is reached when the sharp outlines of 10-point print placed directly beneath the water-bath or directly below the flask and observed through the liquid are obscured or blurred, but not to the point where the print becomes illegible. Check the temperature in the flask immediately after the end-point has been reached and, if over 26°C or under 24°C, repeat the titration.

6.2 The volume of toluene, in millilitres, used represents the actual titre for the particular kauri-butanol solution at hand. This value should lie reasonably close to 105 ml but not over 110 nor under 100 ml. If these

limits are exceeded, adjust the concentration to bring the total within them. Designate the final value using toluene as *A*.

6.3 Weigh out 20.0 ± 0.1 g of the kauri-butanol solution (adjusted as described in **6.2**) in a 250-ml Erlenmeyer flask and place in the water-bath. Titrate with the heptane-toluene blend in the same manner as described in **6.1**. Designate the volume, in millilitres, of the blend used in this titration as *B*.

6.3.1 If the composition of the blend is known to differ from 25.0 ± 1.0 percent toluene, but is within 22 to 28 percent toluene range, the constant in the blend factor equation differs from 40.0 by 0.60 units for each one percent toluene. For example, at 28 percent toluene the constant is 41.8 instead of 40.0.

6.3.2 Freshly prepared kauri-butanol solution may change in standardization from day to day. It is, therefore, desirable to permit the solution to age before initial standardization and, in any case, the standardization should be rechecked on successive days until the toluene factor and blend factor remain constant.

7. PROCEDURE

7.1 Weigh 20.00 ± 0.10 g of the adjusted kauri-butanol solution in the Erlenmeyer flask. Place the flask in the water-bath at $25 \pm 1^\circ\text{C}$. Fill the 50-ml burette with the solvent being tested and titrate the solvent in the flask with constant swirling. Gradually reduce the successive amounts of solvent added as the end-point is approached. The end-point is reached when the sharp outlines of the print specimen placed directly beneath the water-bath or directly below the flask, and observed through the liquid, are obscured or blurred, but not to the point where the print becomes illegible. Check the temperature in the flask immediately after the end-point has been reached and, if over 26°C or under 24°C , repeat the titration. Designate the volume of solvent, in millilitres, to produce turbidity as *C*.

8. CALCULATION AND REPORTING

8.1 Calculate the kauri-butanol value as follows:

$$\text{Kauri-butanol value} = \frac{65 (C - B)}{A - B} + 40$$

where

C = volume in ml of sample required to titrate 20 g of kauri-butanol reagent (see **7.1**),

B = volume in ml of heptane-toluene blend required to titrate 20 g of kauri-butanol reagent (see **6.3**), and

A = volume in ml of toluene required to titrate 20 g of kauri-butanol reagent (see **6.2**).

8.2 If the burette is maintained at a temperature other than $25 \pm 1^\circ\text{C}$, correct the volume of solvent used to standard temperature as follows:

$$\text{Correction, ml} = C (25 - T) \times 0.0009$$

where

C = volume in ml of the solvent used in the titration, and

T = temperature of the solvent in the burette in degrees celcius.

9. PRECISION

9.1 Results shall not differ from the mean by more than the following amounts:

<i>Kauri-Butanol Value</i>	<i>Repeatability</i>	<i>Reproducibility</i>
30 to 90	$0.01 K - 0.1$	$0.03 K + 1.0$

where

K = average kauri-butanol value.